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Phillips

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THE PALEO-INDIAN IN THE NORTHEAST*

by

WILLIAM A. RITCHIE

Sometime prior to about 10,000 years ago, paleo-Indians equipped with the heavy fluted points of the Clovis industry were hunting the mammoth, horse, camel, bison and other late Pleistocene fauna in the southern High Plains and adjacent areas of the United States. Especially graphic records of this remote epoch have been revealed in bone deposits with associated Clovis points at Clovis, New Mexico, Lubbock, Texas, Naco and Hereford, Arizona.

The older or Clovis occupation zone at Clovis and Lubbock occurs in lacustrine or fluvial deposits indicative of moist and probably cool climatic conditions. At these same sites there is an overlying geologic deposit reflecting a succeeding long span of extreme aridity. This was followed by a second period of moist, cool climate responsible for the accumulation of diatomaceous earth or humic soils in which occur the generally smaller and more finely chipped fluted points of the Folsom category. These are associated with the bones of the principal quarry at this period, *Bison taylori*.

A radiocarbon date of $9,883 \pm 350$ years ago on carbonized bison bones from the Folsom level at the Lubbock site, suggests that the early dry cycle intervening between the Clovis and Folsom horizons, long preceded the Altithermal phase of Antevs, which is estimated to have occurred between approximately 7,000 and 4,000 years ago.

Inferences from radiocarbon dating would thus equate the Clovis industry with a late phase of the Cary ice advance, of the Wisconsin maximum, in the north; the succeeding warm dry interval with the Two Creeks interstadial, radiocarbon dated at about 11,000 years ago; and the Folsom industry with the following pluvial or wet episode related to the Mankato-Valders advance of late Wisconsin time.

It has been postulated that the long drought period indicated by the geologic deposits found between the Clovis and Folsom horizons, may have caused a movement of the Clovis hunters out of the southern High Plains and into the better watered southeastern United States, following the big game animals through a thinly wooded prairie corridor which seems to have extended across the Mississippi, along the Ohio and Tennessee valleys, and as far east as Virginia. Vestiges of a relict prairie flora have been described within this area, which has also produced the major portion of paleo-Indian cultural remains from the eastern United States.

Unfortunately, in the eastern United States, evidence has not yet been reported for the association of fluted points with either faunal remains or radiocarbon datable materials. Here, until recently, the data for an Early Hunter period consisted solely of sporadically distributed, mostly surface finds, or fluted points, exhibiting a range of shape and size which, according to Krieger, falls for the most part within the established limits of variability of the Clovis Fluted form. A major deviant, the so-called Cumberland Fluted point, appears to be a locally derived variant in the southeast. During the past decade, however, actual or probable paleo-Indian components have been recognized in Kentucky, Alabama, Virginia, Pennsylvania, Vermont and Massachusetts. On these probable camp sites fluted points form part of a chipped stone complex which exhibits regional qualitative and quantitative differences. This complex includes end and side scrapers, knives, and graters with delicate spurs. Except for the fluted points themselves, and certain knife forms, the industry is based upon uniface flakes with marginal retouch.

In the Northeast as a whole, traces of the paleo-Indian are relatively and absolutely scarce. The data which I have been assembling would seem to indicate that early man had not found his way here until well after the disappearance of glacial conditions in the area. Indeed, attempted correlations of fluted point find-spots and late Wisconsin lake and marine invasion features, strongly suggest the post Lake Iroquois, Lake Vermont, and even Champlain Sea maximum, distribution of the artifacts. As an instance, fully 41% of all fluted points from New York State, whose provenience is ascertainable, were found within the basins of late lakes Iroquois and Vermont, and must therefore be subsequent to these bodies of water. Admitting the current difficulties and uncertainties surrounding interpretation of the Pleistocene geologic record in this part of the country, and particularly the tentative nature of the chronology involved, it is my provisional conclusion that the paleo-Indian segment of the prehistory of the Northeast falls somewhere between about 7,000 and 5,500 years ago.

*Given at the annual meeting of The Society for American Archaeology Madison, Wisconsin, May 2, 1957. Published by permission of the Director, New York State Museum and Science Service.

THE PALEO-INDIAN IN THE NORTHEAST

It is, of course, possible that early hunters entered the area, and inhabited certain regions of the Northeast lying south of the enumerated late-glacial and post-glacial barriers, prior to the postulated maximum of 7,000 years ago, a figure based on geological estimates for the Champlain Sea, which is believed to have come into existence only a few centuries after the disappearance of lakes Iroquois and Vermont. It is much less probable that their fluted point-using descendants remained as late as 5,500 years ago, for radiocarbon dating shows a definite occupation in New York State around this time, by early Archaic people having a totally different culture.

The distributional picture of the paleo-Indian in the Northeast, based upon all the data currently at my command, leads me to assume that during a rather narrow time interval of some 1,500 years, between approximately 5,000 and 3,500 B.C., this area was sparsely occupied by very small, widely scattered, and virtually free wandering groups of hunters. Their routes can be traced, generally on

the higher ground, by shadowy trails of fluted points, apparently running northward and eastward up the Ohio, Allegheny, Susquehanna, Delaware, Hudson, Connecticut and other large and small rivers, and along the coast into upper New England. The direction of movement is inferred from the distribution of flint materials in relation to their known sources. Thus the characteristic southeastern Pennsylvania jasper affords a good trail marker. This interesting matter is discussed more fully in my monograph, "Traces of Early Man in the Northeast," (New York State Museum and Science Service, Bulletin No. 358, Albany, 1957).

As the period between 5,000 and 3,500 B.C. falls within the thermian maximum of the post-Wisconsin, climatic conditions in the Northeast during paleo-Indian times were probably relatively warm and dry. Oak and pine were replacing hemlock, birch and beech in the forests which, according to some new radiocarbon dates from Michigan and Indiana, may still have harbored such big game as the mastodon.

OBSERVATIONS AND CONCLUSIONS REGARDING THE ARCHAEOLOGY OF THE COCHATO RIVER VALLEY AREA

by

WESLEY C. COTE

Photos by Douglas Prince

Located seven miles inland on the South Shore of Massachusetts Bay, the Cochato River Valley may be defined as that broad depression roughly one mile wide and four miles long beginning at "Holbrook Grove Pond," Holbrook, and ending at Pond Street in South Braintree. The area can be observed from Route 37 located on the high land east of, and running parallel to, the valley. Through this valley winds the Cochato River which has its formation in Holbrook, the watershed between Massachusetts and Narragansett Bays. As this river proceeds in a north-northeasterly direction through Holbrook, Randolph and Braintree, it is joined by numerous small brooks and streams which originate from swamps and springs. At South Braintree it is joined by Blue Hill River and becomes the Monaquot which empties into Fore River and thence to the ocean.

Two distinct hunting, fishing and food gathering cultures are clearly defined as having inhabited this area at different periods. Both are non-agri-

cultural and neither appears to have possessed any pottery of any kind. These cultures may be classified as "Early" and "Late Archaic." The early people were representatives of a very early northerly movement along the northeast coast of the United States which protruded inland by way of river valleys. Remains of this early movement have been recognized at other prehistoric sites in eastern Massachusetts, Rhode Island, and especially in New Jersey

Reaching the Cochato River Valley by way of the Monaquot River, the "Early Archaic" family groups occupied three sites (The Mill Street Site and two smaller sites on the old Lind property where Lindwood Cemetery is now located) in the present town of Randolph at the southern end of what was originally a fair sized glacial lake, the outlines of which can now be observed in the form of a large tract of marshland called "Broad Meadows." In all probability this entire area witnessed considerable topographical, geological, and climatic

changes since this occupation some three to five thousand years ago. The Cochato River, along with the streams flowing into it, was probably larger than at present with clearer and more definable shorelines and containing less mud and swamp debris. This river formed the channel for the ancient lake at "Broad Meadows" and for small bodies of water such as the present "Sylvan Lake" and "Holbrook Grove Pond."

The recovered artifacts from the excavated "Early Archaic" sites appear to be quite uniform as far as implement type and type of workmanship are concerned. Most all were made of various forms of felsite with much smaller numbers of argillite and quartzite. The principle implement in use was the spear with its corner-removed stone point or maybe, as slight evidence shows, a type of eared point. This was probably propelled by a spear

thrower with an atlatl weight. At Cochato, corner-removed projectile point type No. 9, with its rounded and almost pointed base, gradually merges into type No. 5, which is characterized by a slight bifurcation of the base. A great proportion of points recovered seem to fall into what one might class as a half-way point in this merger with lengths ranging from one and one-eighth to three and one-half inches.

Due to the appearance of a few small triangular points, there is a possibility that the bow and arrow was in use on a very small scale, but this is open to question.

The oval shaped stone knife or blade, inserted probably in some sort of bone or wooden handle, was in use to a very great extent as was also large turtle-back and steep edged types of scrapers, showing considerable activity in the dressing of

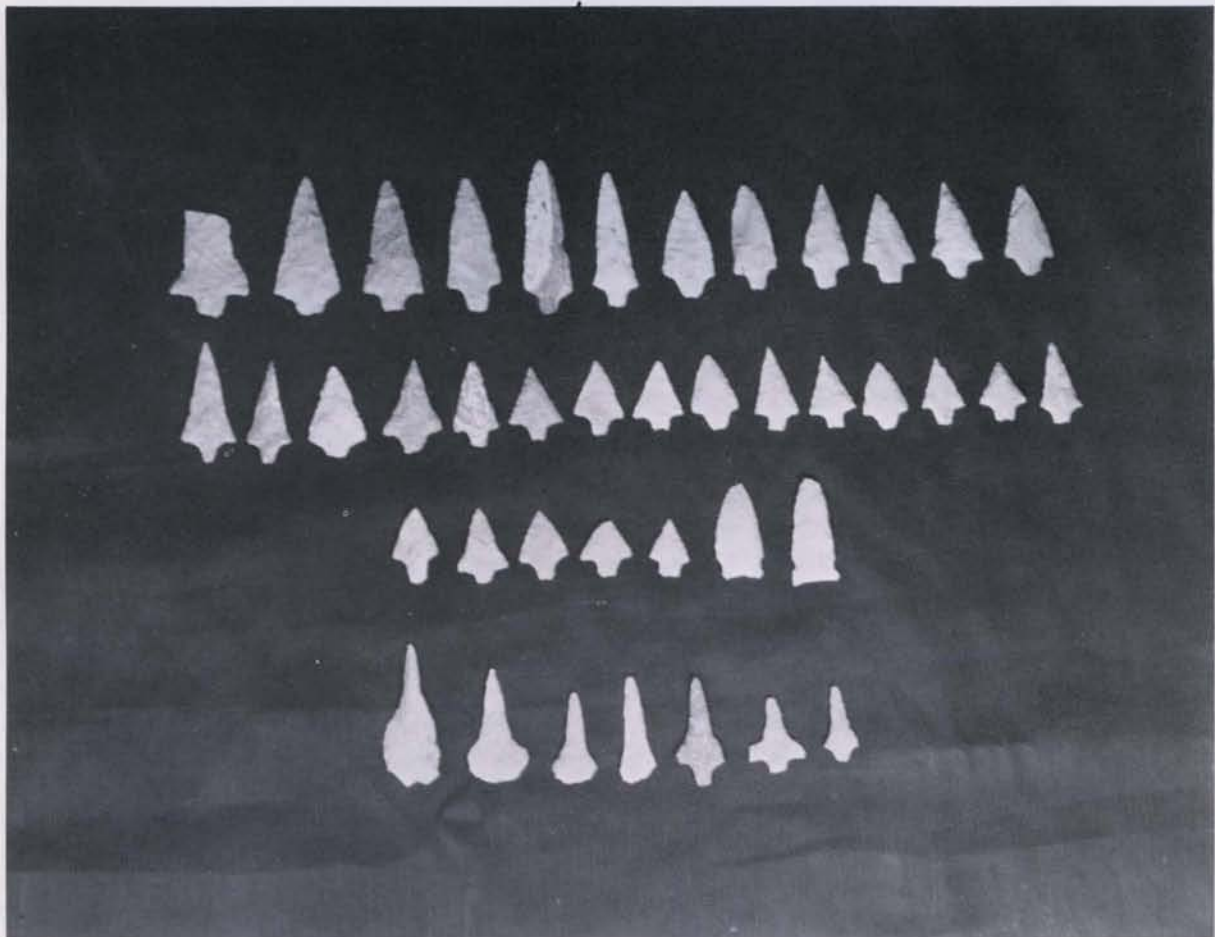


PLATE 1. First three rows—projectile points. Lower row—drills. Early Archaic Period.

ARCHAEOLOGY OF THE COCHATO RIVER VALLEY AREA

hides and skins, preparation of meats, and wood-working. In use to a much lesser extent were stemmed knife forms, maybe the semi-lunar knife, and small end scrapers. Roots, nuts, and bones were probably crushed on flat slabs of rock with the hammerstone and chopper. The art of drilling such objects as ceremonials and probably the perforating of skins is suggested by the recovery of cross and expanded base drill forms. Although it is highly probable that these people manufactured dugout canoes, this being their only artificial means of transportation, the existence of gouges is extremely rare, this form of tool appearing only in fragmentary cases in what we are sure to be the early level. The types of tools in use for heavy work included large chipped and pecked forms of grooveless axes and what appeared to be large hand axes. The practice of fishing is shown by the recovery of a grooved sinker which was probably used to weigh down nets, no evidence of the use of "plummets" being recovered from this early level.

As was shown by the recovery of overwhelming numbers of chips, flakes, cores, rejects, hammerstones, and incompleated implements, much time and labor was spent in the manufacture of weapons and tools. This was especially true at Mill Street, largest of the three "Early Archaic" sites excavated. The workmanship displayed by these early people on their projectile points and drills surpasses that of the "Late Archaic." There is considerable evidence showing reworking of broken projectile points, and unbelievable numbers of broken and unfinished blades or knives are present.

Raw material for implement manufacture may have been obtained from felsite ledges and boulders in the Blue Hills some three miles away. The area near Blue Hill Cemetery, Braintree, presents a picture of prehistoric stone working. Immense quantities of flakes, cores, and rough incompleated blades, along with felsite boulders showing artificial fracturing, are present. Also in evidence are small numbers of completed artifacts showing distinct relationships with both the "Early" and "Late Archaic" of Cochato.

At the Mill Street Site the arrangement of the ten fireplaces or hearths appears to follow an almost orderly manner, usually measuring forty feet apart, more or less, with a tendency to follow the course of the south slope as does also the "Early" artifact bearing area. These hearths are roughly three feet on the outside diameter and are con-

structed of a double layer of cobblestones most of which were fire cracked and had fallen into the center. Most all contained charcoal, some of which indicated the use of sticks two inches in thickness for fuel. Only two recognizable firepits were uncovered at Mill Street, these measuring less than twelve inches in diameter, and containing ashes and charcoal. This presents a contrast to the Lind Sites, which were covered with these small firepits or burned areas, some of which contained immense quantities of small chips. Three unidentified disturbed areas or pits, some three to four feet in diameter, were discovered at Mill Street. These ran to a depth of approximately three feet below the "Early" artifact bearing level, and contained fire-reddened sand and charcoal. Although nothing was found to substantiate such a claim, the possibility of these being graves should not be overlooked. Although there was uncovered what was thought to be two paved areas at Mill Street, no visible post molds or any other signs of living quarters were detected. These people probably lived in temporary skin shelters.

This early group of hunters probably left this area after a relatively short but intense occupation. The cause may have been a combination of two factors: 1. The northerly movement of certain animals on which these people had become dependent, and 2. The changing topography and climate was probably producing a gradual swampy condition which eventually replaced the once well-defined shorelines of lake and stream with mud and marsh grass.

Gravel and sand distribution, especially at Mill Street, a site located on a small knoll, most of which had never been artificially disturbed, tends to suggest considerable erosion or surface displacement after or maybe during the "Early" occupation period, a condition which does not manifest itself in the "Late Archaic" level. Normally the "Early Archaic" zone appeared in the fine yellow sandy subsoil from two to four inches below the junction line of this material with the black humus; however we find that this varies with the rise and fall of the gravel floor which, in most cases, underlies the subsoil. At some points the gravel reaches the junction line and continues for a number of feet before it drops off and the yellow subsoil again appears. It is important to point out that whenever these gravel crests reach this stage, occupational evidence in the form of chips and small artifacts, which are normally abundant, disappears; and the area re-

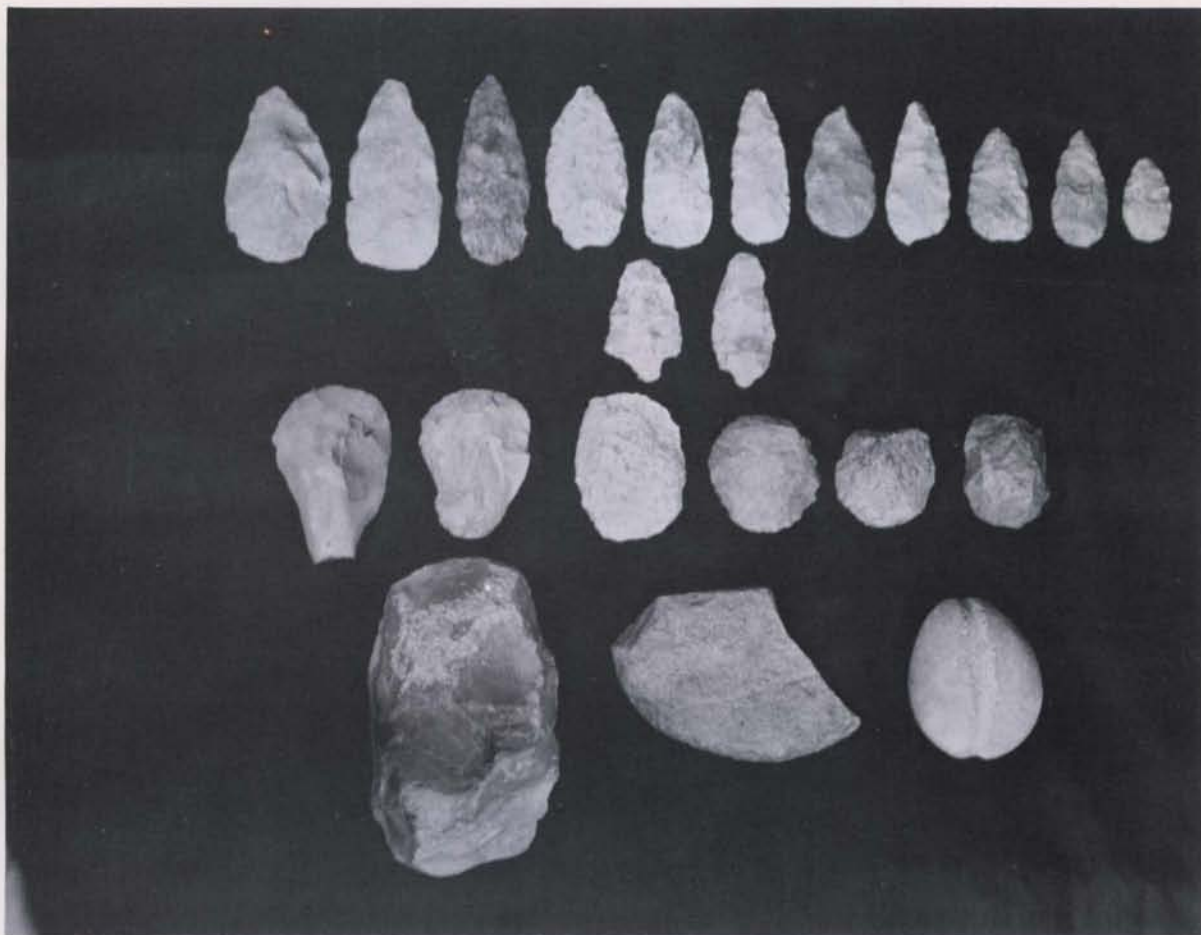


PLATE 2. Top row—knives or blades. 2d row—stemmed knives. 3d row—turtle-back or steep-edged scrapers. Lowest row—left to right—chipped axe, semi-lunar knife, sinker. Early Archaic Period.

mains sterile, with the exception of an occasional large flake or larger artifact, until the gravel drops off and the subsoil again takes hold. At Mill Street a gravelly condition exists at the north end or at the highest point of the site, and from this point the gravel appears to infiltrate into the yellow subsoil in a southerly direction. Generally the central portion of the site is stable except for occasional interspersions of gravel, and as the south slope is neared the yellow subsoil increases in depth, as does also the "Early" artifact bearing level. Also, at the southernmost point of the site white sand is encountered below the subsoil. This seems to suggest a southerly movement of an erosive agent, either wind or water. It is difficult to explain the absence of "Early Archaic" occupational material on the gravel. A possible explanation may be that most of the light material was removed and displaced along with the yellow sand by the erosive element. The only other alternative is that the early people occupied only that surface made up of the

fine yellow sand or subsoil and completely avoided the coarse gravel, a practice definitely not followed by the "Late Archaic" people, whose remains are found at the junction line, on both subsoil and gravel.

It is quite probable that an unknown period of time passed before a series of unrelated visitations by very small groups of hunters of the "Late Archaic" period occurred in Cochato. These hunters came, occupied selected locations for very short periods of time, and then departed. This series of visits probably covered a great expanse of time and, as recovered evidence shows, were not entirely uniform as far as resulting artifacts are concerned. Evidence appears at small sites in Randolph (Gill Farm, Central Cemetery, Martin's Brook) and in Holbrook (Spring Brook, Wright Farm) and also on the same sites previously occupied by the "Early Archaics." At Mill Street only a small portion of the site was occupied by these later hunters. However the previous occupants had taken advantage of

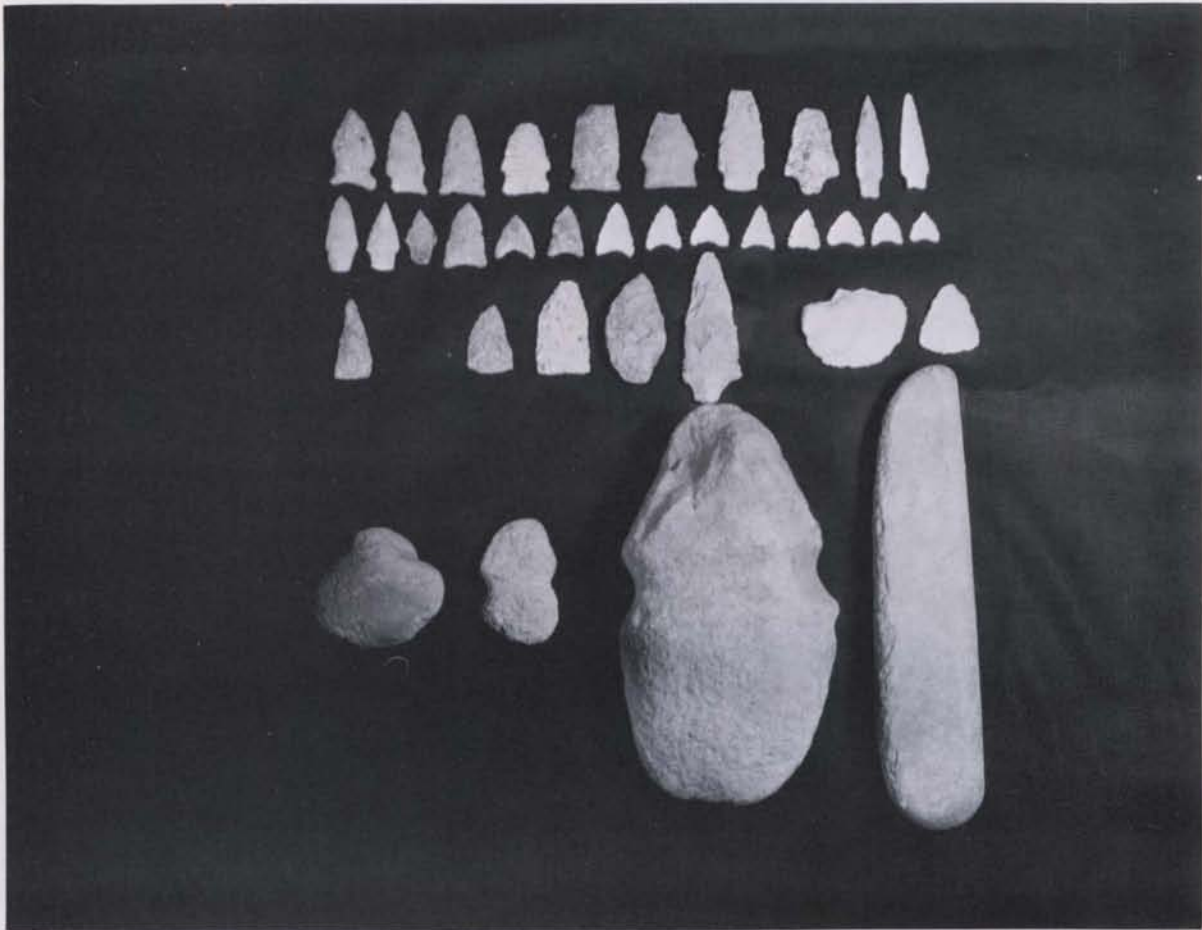


PLATE 3. First two rows—projectile points. 3d row—drill, knives, scrapers. Lowest row—plummet, clubhead, grooved axe, pestle. Late Archaic Period.

practically the entire top of the knoll. There are indications of the existence of other small sites of this period in Cochato.

Probably related largely to an immigration originating to the west, many of these late groups may have come up the Cochato River in the same manner as did the "Early Archaic" groups. Artifact evidence shows a distinct relationship with the "Stone Bowl" period in Massachusetts, and the "Laurentian Aspect" of New York State's pre-Iroquoian occupation. It is important to point out here that there appears to have been a very slight relationship or overlapping between the earlier period and these later visitors—however any similarities are overshadowed by the great differences.

Although there is considerable ununiformity of recovered artifacts at the several sites of this later period, generally they show a predominance of small triangular projectile points, along with a number of small stemmed points, tending to suggest

the general use of the bow and arrow. The spear was probably still used to a great extent as numbers of eared and side-notched points, along with corner-removed types, seem to indicate. Although the oval knife was used to some extent, the great quantities encountered in the "Early Archaic" level are absent. The stemmed knife was in use, also oval scrapers or choppers, and end scrapers. The semi-lunar knife may have persisted—the chipped axe however gave way in time to the grooved style. Pestles and a circular shaped maul probably replaced hammerstones as a means of grinding foods. The recovery of a plummet and a sinker attest to fishing activity during this period. Although these later visitors seemed to have participated less in workshop activity, there is evidence showing work of this sort, especially in quartz, a material completely ignored by Cochato's "Early Archaics." One complete hearth of the same type and size of the earlier ones and representative of this period was

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found, in addition to numerous dispersed firestones and charcoal. Evidence in the form of an occasional post mold suggests the possibility of this later group using a more secure form of shelter than their predecessors.

Finally, after a great and unknown period of time, the "Late Archaic" visitations apparently ceased, as had those of their predecessors, and prob-

ably for similar reasons. Thus far no evidence of occupations by Indians of the "Ceramic" or "Historic" periods have come to light except for an occasional large triangular and a single brass point, indicative of small hunting groups passing through. It is probable that from these latter that we get such local Indian names as Cochato, Tunkawatan, and Monantiquot. The area probably remained unsettled until the arrival of Europeans.

ARTI-FACTS AND FANCIES

by

THE SOUTH SHORE CHAPTER

Illustrations by Anne Kirkendall

Part I

If you, as an amateur archaeologist, have been successful in doing field work, you probably have found that your collection of artifacts encompasses three categories: the easily classifiable, the recurring problematical, and the indeterminate.

Examples of artifacts easy to classify might include arrowpoints, axes, celts or gouges. Within the bounds of recognized problematics might fall such items as plummets, hammerstones or gorgets. But artifacts that fit into our new category, which we propose to call the indeterminate, are those that may have been inappropriately catalogued or may have had no niche at all. We are using the term indeterminate in its true sense, meaning: indefinite, not distinct or precise, not fixed, not predetermined, and not leading to a definite end or result.

Artifacts in the first category, those that are easy to classify, are a delight to the archaeologist who recognizes them for what they are, examines them, marks them and places them neatly in his collection.

Artifacts in the second category, the recurring problematics, are also easily recognized. For instance, when a bannerstone is mentioned, the mind forms a mental picture of the winged bannerstone, thought to have been used either ceremonially or as an atlatl weight. The bannerstone is a good example of the problematical because it is a well known artifact whose origin is obscure. In addition, its uses, as we consider them, are but educated guesses. Thus, problematics are largely of frequent recurrence, but of undetermined origin, and of hypothetical use.

While certain uncommon artifacts have for the most part been classed as problematics, we believe that after thought and reflection upon them, others may come to agree with us that they really fit into our third category, as indeterminates. Time and acculturation have obscured the uses for which they were created, and because they are so rare, the finder is the only one who retains a mental picture. We have made it a project to speculate concerning them, and we find that they offer a real challenge to the imagination.

Among the collections of our South Shore members, we have found a number of these puzzling pieces. On the basis that our collections are probably representative of those of similar groups, we would like to expose the puzzlers to your critical eyes for purposes of comparison with like items that you may have tucked away and forgotten. We hope that our examples may not be one of a kind. If we succeed in locating others like them, and can obtain knowledge on the distribution of these items in our area, we might well find them to be diagnostic. Through cooperation with neighboring societies, it might even be possible to establish these as link traits, or they could prove useful as supplementary data in tracing migration routes.

Accept our invitation into the realm of artifacts and fancies. Conjecture with us, as we did during the preparation of this paper. We have fancied some practical uses and a few perhaps whimsical ones, too. Consider it an exercise in imagination. Indians certainly exhibited imagination in making the following indeterminates—

The first item in the indeterminate category is a gray sedimentary stone resembling an index finger in shape, about five inches long and three quarters of an inch at the maximum diameter, but unlike a finger, it is grooved around the middle. (See Fig. 1). It was found on farm land at the mouth of Back River, in Hingham, Mass.

For it we have fancied several uses. One might have been as a handle for carrying a string of fish, although the fellow who fashioned it must have been a very good fisherman since only a heavy string would require a carrying handle. Another use might have been as a lure for a large fish or seal. Imagine an Indian crouched by a hole in the ice, holding not just the stone on the end of a line, but the stone inserted into a small fish. The stone then serves as a weight, sinking the bait fish, and luring the quarry within striking distance. This stone might also serve as an aid in drawing and stretching rawhide sinews.

Our second item is a trapezoidal, wafer-like tablet with two slightly convex sides, measuring roughly two and three quarters by three and a half inches. (See Fig. 2). The present basal edge appears to have been formed by a groove on front and back of the original tablet, presumably to control the break, since it seems intentional as part of the manufacturing process. On the other hand, if the break were not intentional, it could once have been part of a large tablet which when broken was reshaped to a new form to serve as a talisman or ornament. Finely incised lines are scored on it, perpendicular to the broken edge.

The third indeterminate is an olive drab, finely grained, elongated stone, nine sixteenths of an inch at its greatest width and three eighths of an inch thick. (See Fig. 3). Its most outstanding features are the two steps on one edge. It is what we consider a slipstone or other special purpose tool. As a slipstone, its convex edge would ideally fit a small concave surface, for example, to preserve the shape of a gouge while maintaining its keen edge. This specimen was a surface find at the Lind site in the Cochato River Valley at Randolph, Mass. At least one duplication is known and it belongs to Arthur Staples of Cohannet Chapter. It is slightly larger than ours, and was dug at the Wapanucket site.

Our fourth selection is roughly a heart-shaped slab of light gray sedimentary stone, approximately six by six inches, with a thickness varying from three-eighths to three quarters of an inch. (See Fig. 4). One edge shows the result of percussion.

It is grooved about the middle, presumably for hafting, probably with a long handle enabling its user to swing it like a brush hook. This tool would be effective in knocking weeds and maize stocks to the ground in preparation for replanting, or to clear the surface of the ground for a camp site. This artifact was recovered from a Blue Hill site by William T. Williams of Quincy.

The fifth specimen is a triangular prism of red jasper, half an inch high and three-quarters of an inch long, (Fig. 5). It came from the Greenbush Herring Brook site, and we believe it might have been a gaming stone or talisman, or a slipstone for polishing small things, or possibly for applying designs to pottery.

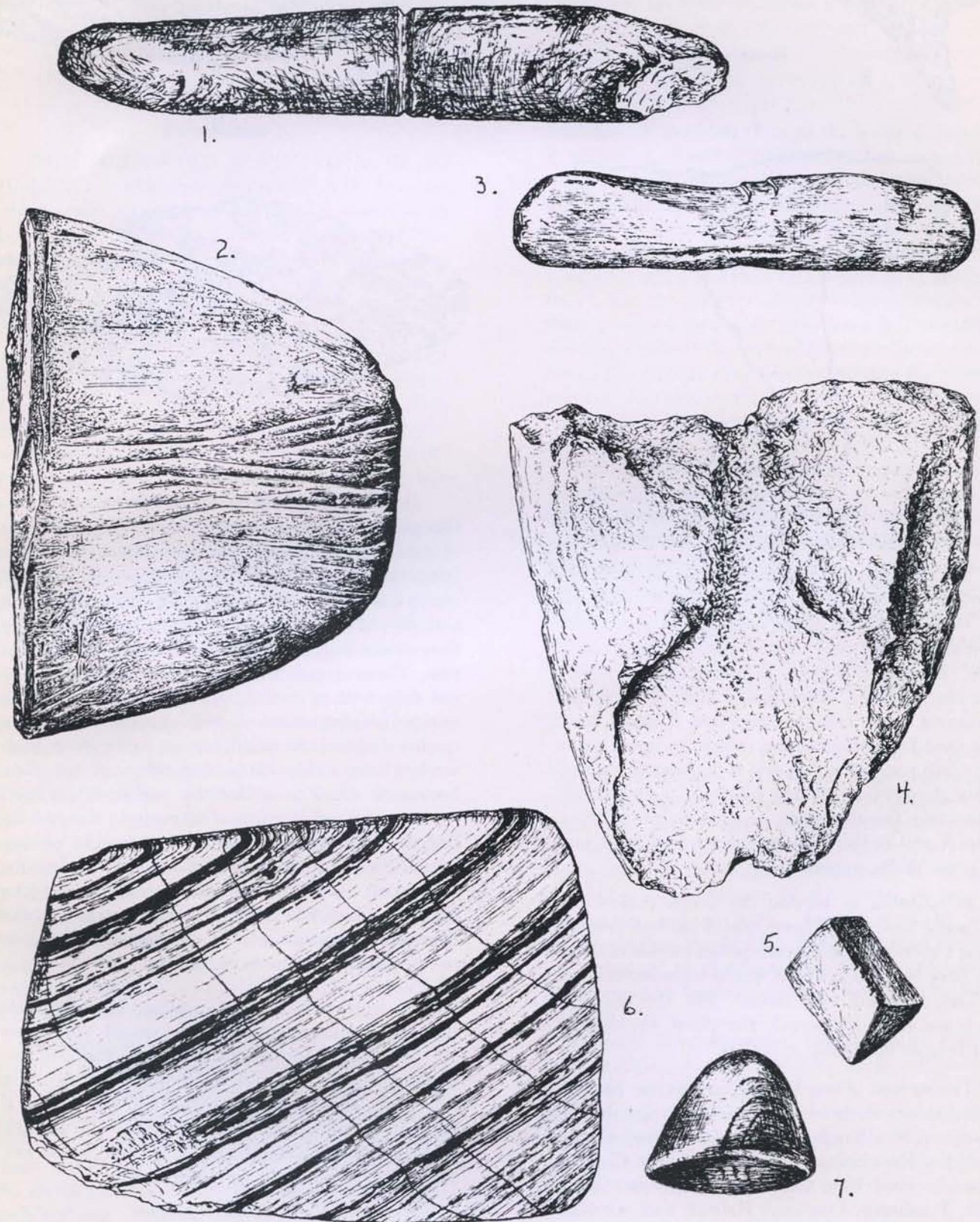
The sixth piece is of polished banded slate, four inches long and two and three-quarters inches at its greatest width. (Fig. 6). It tapers from one eighth to one sixteenth of an inch in thickness. If it has a practical use, such use is beyond our ability to form a mental image, but because of its beauty it might have been a shaman's stone. It was found in south central New Brunswick, Canada, by one of our members.

The seventh implement, resembling an old fashioned gum drop, is of a black igneous stone, (Fig. 7). We believe it to be a pigment muller for ochre which was ground to a powder, mixed with animal grease, refined and used for ceremonial paint. This small stone was found at the Greenbush Herring Brook site. Incidentally, the owner of this piece found an Indian paint pot at the same location.

Part II

Once in a while an artifact widely regarded as easily classifiable or as a recurring problematical, may, upon painstaking examination have important significance in the overall study of archaeology. Hidden in various classifications is an artifact considered at times as a small triangular¹, and at other times as a drill or perforator². We consider it worthy of a sharp re-evaluation.

While the triangular projectile point is symmetrical, close examination will reveal that the example in our illustration is not. Many of these have the same deviations from a symmetrical pattern. In our example (Fig. 8) projection A is broader, shorter and flatter than on an ordinary projectile point. Nevertheless it is finely worked and bears no appearance of having been broken. B, the most elongated projection, is extremely pointed, of delicate structure, and worked and re-



No. 4 is $\frac{1}{2}$ size, rest natural



Fletcher's Tool

8.



finished with great care. C, the remaining point, closely resembles that of a common projectile tip.

The intricacy of workmanship leads us to believe that each projection was intended for a special use. For instance it might have served as a multi-purpose fletcher's tool, carried easily from place to place. Projection A seems to be flat and sharp with knife-like qualities, which would make it a suitable instrument for nocking. Projection B could have been used for removing the pith from bone arrow tips, while projection C seems to be smooth ground as though to reduce chafing if hafted. As a possible explanation for the worn concave edge between points A and B, this may have been used for scraping arrow shafts smooth.

In addition to serving the arrow maker, the tool could also have been useful in leatherwork. In our experience, no broken points of this unusual type have been found, so it would seem logical that the uses required little stress. For the purposes which we have suggested, the point could have been held in the hand, or hafted.

To the best of our knowledge, no one site has yielded many of these tools, yet their distribution throughout New England seems widespread, almost precluding their being created by accident. Chapter specimens have been found at Bridgewater, Randolph, Pembroke, Duxbury, Halifax, and recently, in Maine.



9.



Clam Opener

Part III

Because we of South Shore Chapter feel that thought should not stop with the stated classification of an implement, we would also like to take this opportunity to amplify the use of the artifact classed as a stemless knife, (Fig. 9). While the majority of stemless knives are characteristically thin, those found on seaside sites frequently are not. These exceptions seem to have been designed not only with a cutting edge but with deliberate wedge-like proportions as well. Because of its lithic qualities, the stone could just as easily have been worked into a thin blade, but this was not done because it seems to us that the workman had need for a specialized instrument to perform the task he had in mind. First, he needed a straight cutting edge. Secondly, he needed a tapered, wedge-like blade that would have greater strength. In our opinion, necessity mothered invention; hence, the first quahog knife, useful in opening great quantities of partially steamed mollusks.

To summarize—if any readers have artifacts resembling those described, we would appreciate all pertinent information including the number found, the lithic material, the location and depth in relation to other artifacts, if dug, and the period, if known. A penny post card to Robert D. Barnes, Chairman South Shore Chapter, 9 Laclede Avenue, Saxonville, Mass., will be appreciated.

1. Preliminary classification outline.
2. Under crescent drills, Item #1.

THE MASSACHUSETTS ARCHAEOLOGICAL SOCIETY

THE MOORING HOLE PROBLEM IN LONG ISLAND SOUND

by

BERNARD W. POWELL

Introduction

THE PURPORTED NORSE VOYAGES TO VINLAND in the eleventh century A.D. have received much attention in the popular literature in recent years. When such articles are sifted of misleading statements—and the outright “hoax potential” of finds like the Beardsmore find in Ontario—there yet remains a residue to attract the impartial student of archaeology. At present, “authorities” on both sides of the question as to whether Leif Ericson did or did not land on the North American shore, hold diametrically opposed views. Such extreme positions grade down to a “wait-and-see” middle ground held by many investigators who believe the problem cannot be settled definitely one way or another at this time—perhaps ever.

While a great deal of *literary source material* exists to the effect that one Leif-the-Lucky sailed westward from the Greenland settlements to land on an unknown shore in the summer of 1003 A.D.—no concrete artifact has ever been found in North America that either 1) has been accepted as genuinely Norse and from the period in question by *all* authorities concerned, or 2) has been found or recorded in a manner that placed its validity above question—not to mention the motives of those finding it. Many “finds” that have been put forth as evidences of Norse visitation in North America have been “discoveries” of untutored persons, curiosity seekers, or well-meaning but untrained enthusiasts. We who are archaeologically-oriented, find in this state of affairs a challenging prospect. If only a *trained* archeologist could come upon a site that gave evidence of occupancy by Europeans during the time in question! This would be a great step forward in an admittedly highly restricted phase of North American prehistory.

Followers of archeology, however, need not be reminded of the difficulties in locating and recovering material from aboriginal sites—and the Indians and paleo-Indians have lived in the Northeast in relatively substantial numbers for several thousand years. Yet all too frequently, the diligent and scientific search for their habitation sites results in absolutely nothing. Erosion, cultivation, and excavation by non-observant persons, and the slow decay and

oxidation of materials through the centuries, results in scattering of artifacts, obliteration of surface features, and the return of organic materials to the dust whence they came. And when one recalls the exceedingly limited number of Norsemen who may have come out to Vinland over a decade or so (probably *never* in excess of 300 persons at any one time), and the correspondingly fewer evidences of their presence that must have been left behind—the magnitude of the archeological problem is seen anew. The straight odds against locating the limited number of campsites for these eleventh century seafarers somewhere along the North American coast are distressingly “astronomic.”

This rather negative forward secures (I hope) an impartial position from which to introduce the main thesis of this article. If I seem unduly pessimistic about the presence of Norsemen along our New England shores a thousand years ago, it is only because I have been so often dismayed with the bland assumptions that the Norse did *in fact* make their landfall here. This is the *very thing* yet in the balance—to be scientifically proved—and uncritical acceptance is not to be tolerated.

Part I

One of the most promising sites for Leif’s “booths” or shelters, built as the sagas relate, for protection during the stay in Vinland, seems to be Cape Cod. A great many early theorists considered the latitude of the Cape as favorable for many things observed in Vinland, i.e. altitude of the sun at midday meals, temper of the winter, botanical phenomena and so forth. Recent work by our fellow member, Frederick J. Pohl, goes even further and attempts to designate the exact spot where the Norse first landed: Follins Pond on the Bass River.

Shortly after surveying the shores of Follins Pond in 1951, I met Mr. Pohl for the first time and discussed with him many intriguing aspects of the entire problem. One that he mentioned at that time—and which I have subsequently followed up in rather more detail—concerns the possible occurrence of “mooring holes” along both shores of Long Island Sound. That is the real substance of this paper, and my reason for bringing it to the attention

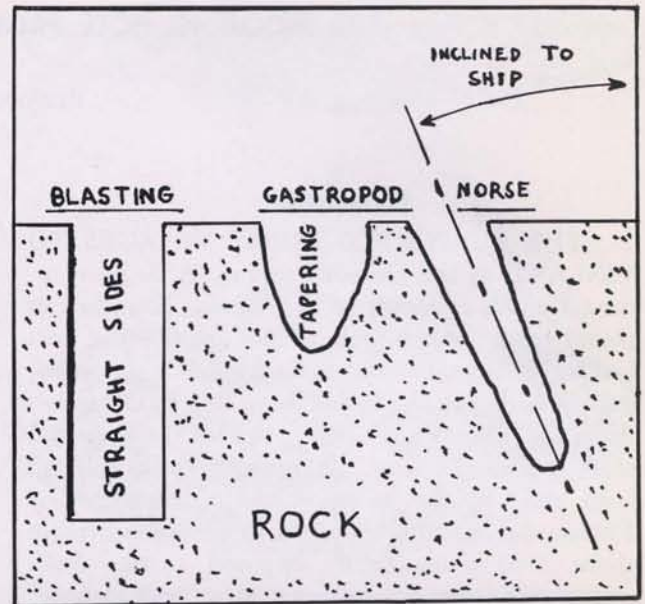
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primarily of you members of the Massachusetts Archeological Society is that many of you may be suited to do some field checking for us on this problem. I will explain what I have in mind a little later.

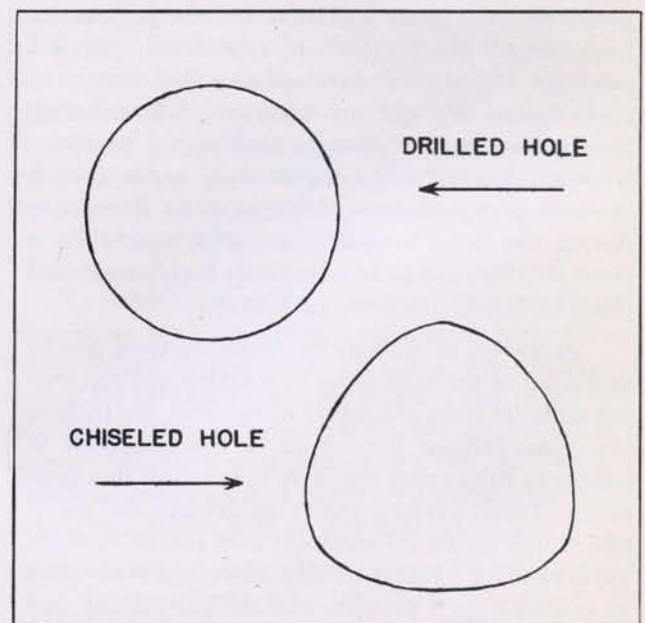
First, what exactly do we mean by a "mooring hole"? Along the shores of the fjords in Norway—and in other waters of Scandinavia—are numerous large boulders and exposed rock ledges. In many of these are holes drilled to varying diameters and depths, and known to date from Viking times. They were made by Norse sailors for mooring their vessels. In use, boat lines were made fast to wrought iron pins with eyed-ends which were inserted in these holes.

Several things are noteworthy about these Norse mooring holes. One is the fact that they almost invariably are drilled at a slight angle past the vertical to slope away from the direction in which the rope (and hence the strain) would have come. They vary in depth—but as little as six inches was more than adequate in many cases. Diameters may be from one inch to one and one-half inches; a marine engineer¹ has calculated that a wrought iron pin one inch in diameter has an ultimate sheer value of 31,406 pounds. A viking ship sixty-five feet in length moored broadside to a sixty-mile-an-hour wind would have caused a strain on each mooring line of from 1,950 to 7,500 pounds which would have varied with the angle between the hawsers (if more than one), and the direction of the wind. The same ship held bow to the wind would have presented less resisting surface or windage, and would have created a strain of only 1,080 pounds.

Another interesting aspect of the mooring holes complex is the fact that the holes were apparently often used in pairs for lines run out both fore and aft from the vessel. Many of the Norwegian fjords are narrow, and in those latitudes, tidal currents are swift and the daily tidal variation quite marked. Consequently, wooden vessels moored in such potentially dangerous waters, run considerable risk of damage. Formerly, vessels rarely, if ever, swung to a single anchor after the continental European method. Made fast in such a manner, Norse boats would have gyrated violently about their anchor lines and would have been swept either into one another or onto the numerous rocks and skerries. Therefore, they were moored both bow and stern to iron pins inserted in the drilled holes. These holes might be in rocks on opposite shores of narrow bod-



ies of water—or in rocks on shore and in ledges immediately offshore, if harbors or coves were too wide to permit running a line clear across them. So moored, the vessels rode securely up and down as the tides rose and fell: the method was a satisfactory, indigenous solution to a "problem of the environment", as I suppose cultural anthropologists might say. Such a method of mooring was the *modus operandi* of the Vikings, and we assume that this "proper" way to moor must have been used by their later descendants in the Greenland colonies and those ultimate voyagers to the shores of New Eng-





land, if such indeed is the place where they landed. This assumption is implicit in any development of a theory based on holes drilled in our coastal rocks and whose presence cannot be explained otherwise.

Another thing about such a method for mooring that endeared itself to the quarrelsome and rugged Norse, is the fact that it hastened getting under way (whether to flee from stronger forces or to pursue weaker ones being immaterial!) It is said that when vessels were so moored with constant strain on the lines from the ship's weight, the lines would hold secure against all hazards. However, a sailor on deck had only to grasp the anchor line in his hands, pay it a little slack and give it a sharp shake, and the subsequent "wave-front" would travel down the rope and flip the pin neatly out of its hole, whence the line could be drawn in at leisure. Thus, a group of warriors camping ashore, on hearing the alarm, could instantly grab their arms and run aboard while some of their number got in mooring lines and others shook out sails or

ran out oars—all very rapidly and with little lost effort. Obviously, a simpler and more efficient process than the "manning of the capstan" that marked weighing the anchor on later European sailing ships.

The eleventh century Norsemen were, of course, well-advanced in the Iron Age, and versed in the manufacture of hammers, swords, chisels, and similar implements. Hand sledges and rock chisels (like cold chisels) were standard equipment of the maurauding "dragon" boats of those days. These tools were used for the express purpose of drilling mooring holes when the company decided to go ashore (usually to the dismay of some innocent coastal village or monastery). As an aside, it is interesting to note that priests of the Roman Catholic Church in Ireland began and ended every mass in those times with the plea: "And from the furies of the Norseman, O Lord, deliver us."

Actually, those unacquainted with the problem are often amazed at the relative speed with which

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one can sink a hole into rock with an iron chisel. This is not a tedious operation at all. Supposedly, a good man can drill a satisfactory hole in less than fifteen minutes, no time at all for a group preparing to moor somewhere for the night. Mr. Pohl had some limited experience with such hole drilling; I quote directly from his book²: "He and his son and I, taking turns, leisurely cut a hole 1½ inches deep in five minutes. We found we could not make a round hole with a straight-edge chisel. All our attempts resulted in triangular holes with the corners rounded." This is characteristic of such chisel-drilled holes: they invariably present (in horizontal cross-section) the shape of a spherical triangle with "bulged" sides. The holes tend to taper somewhat towards the bottom (in vertical cross-section) and this and the "bulging" is a consequence of the fact that the person drilling the hole must periodically shift the position of his chisel to maintain maximum cutting. (See illustration.)

Not every hole occurring in rocks along our shores, however, is potentially suspect—in fact, in all probability, very few are. Of course everyone is familiar with modern blasting practices and the drilling of holes in rock for insertion of sticks of dynamite. Such holes are drilled by "star-drills" or special rock drills which are metal cylinders that cut away with abrasive grains (sometimes diamond) around their perimeters and thus remove a solid "slug" or core of rock. Recently-drilled holes for blasting purposes are perfectly circular in horizontal cross-section, and when machine-drilled, may be from one and one-half to two and one-half inches or more in diameter. Such holes are invariably drilled in *rows* for the purpose of breaking rock along a definite line, and are not ordinarily confused with mooring holes at all. The presence of several holes in a line removes any of them from consideration as a Norse mooring hole. Along the shores there is always the chance of finding holes left by U.S. Coast and Geodetic Survey parties in the furtherance of their operations. These holes are usually adjuncts of some kind to bench markers or triangulation stations. A check on this possibility may be had by comparing the location of suspected holes with lists of triangulation stations for the area. Such lists can be obtained free of charge from the U.S. Coast and Geodetic Survey. Anyone seriously interested in helping us is urged to check against these lists when finding suspected holes. Usually U.S.C.&G.S. holes have either lead

plugs or bronze seals in them, but on occasion these could be missing.

A common practice of early survey crews was to leave drill holes with "sunbursts" or outward-radiating chiseled lines surrounding them. Such holes are automatically eliminated as Norse mooring holes. Mariners, fishermen, and others have from time to time erected markers along our shores, and such markers may now be long vanished. If they were guyed or stayed against the wind (not unreasonable along the coast), holes might very well have been drilled for bracing pins or legs. In my opinion, numerous holes around a central spot argue against a mooring hole origin. One authority³ states that colonial fishermen made many holes in our coastal rocks. Isolated holes showing weathering, and at angles and in locales likely to have been utilized by ancient mariners for mooring their ships, are the most likely candidates for true mooring hole status. It should be remembered that many of the "mooring holes" found on the Cape are now eroded and in some places broken clean through (presumably with time and thermal shock) and are thus assumed to be quite old. Certainly weathering of the stone is important, but this is often a subjective judgment, and an aspect of the problem that cries for more research in its own right. Remember too, that prevailing winds enter into the picture in the Sound; in summer they are southwest and vessels would be moored out of such winds accordingly.

And there are other agents responsible for holes in rocks along our shores. Again I quote from Mr. Pohl⁴: "Some holes have been made by grinding or pounding that wore away the rock by use, and these are generally large in diameter and were made by Indians. Other holes have been made by rotating drills, consisting of reeds or cylinders of wood, the cutting being done by wet sand. This method has been used for thousands of years by jade cutters. Where these perfectly round holes are very small, ½ inch or less in diameter, they were probably made by primitive men for religious or other reasons unknown or unguessed at by us. Some of these small drilled holes are deep; others are shallow depressions."

As I have mentioned previously⁵, certain marine gastropods ("snails", etc.) are equipped with a hard, horny, chewing apparatus technically called a *radula*, and with this they can actually chew holes into rock. Ordinarily, the radula is most developed

in predatory forms that chew through the shells of other mollusks, but along exposed shores, these marine animals can chew holes right down into the rock, and do so usually to secure a burrow in which to live and not be washed away by the waves. These holes are sometimes symmetrical and when old enough and weathered, might conceivably give rise to some speculation. Generally, however, they may be noted as having rather widened, tapering vertical cross-sections, and colonies of such marine animals will, over a period of years, likely chew more than one isolated hole in the rocks of the waters where they abound. These then, are only partial explanations for the occurrence of many holes in rocks along our shores; further study will no doubt clarify this picture and perhaps add to the list of possible causes for such holes. But any hole that is 1) isolated in a large rock or ledge, 2) is obviously not "fresh" i.e. shows *some* degree of weathering, 3) has characteristically "bulged" sides and rounded corners, 4) agrees generally with dimensions and angles for mooring holes as mentioned previously, and 5) is logically located with regard to suitable anchorages for vessels, is at least suspect and we would like to know where any such occur in the circum-Sound region, on the south shore of Long Island, and in the vicinity of Lower New York Bay and Staten Island.

Part II

That such mooring holes might be expected in this region is a consequence of the so-called "Thorvald Small-Boat Theory." This concerns the exploration of waters somewhere west of Vinland by one Thorvald Ericson, brother to Leif-the-Lucky. Thorvald came out to Vinland with a picked crew in Leif's boat which he had borrowed for the occasion. The year was 1005 A.D., and the sagas (*Flateyjarbok* version) relate that the following spring Thorvald directed a portion of his followers to take the ship's longboat (small boat carried aboard the larger ocean-going vessel) and explore the region west of Vinland. This a group of men is supposed to have done, staying out the whole summer in the process and returning to the Vinland base in the fall. In respect to this incident, I quote Pohl at length⁶: "In the spring Thorvald ordered a few men to take the afterboat and explore along the coast to the west during the summer. These men found it a pleasing, well-wooded country, with the woods near the white sands. There were many islands and shoals. They found no dwellings of men or lairs of beasts, but in one of the islands to

the west they found a corncrib of wood. They returned to Leif's Shelters at harvest-time.'

Since Thorvald's afterboat party spent the entire summer exploring to the west from the Vinland camp site and did not return for the ship, we may safely deduce that they found a boat as small as the afterboat (about the size of a whale-boat) entirely adequate, and therefore that it was not open ocean which lay to the west of them, but extensive inland waters. These inland waters must have been Nantucket Sound, Vineyard Sound, Buzzards Bay, Narragansett Bay and the inlets of Long Island Sound. A party of only a few men, observing natural caution against the possibility of attack by unfriendly natives, must have fastened their boat many a night to mooring holes in rocks off the wooded shores, since one man could have chiseled an adequate mooring hole in about fifteen minutes. The islets off the shore line of these inland waters might well be searched for such mooring holes."

In the fall of 1954, I discovered the beginnings of a chisel-drilled hole in a shoreline boulder of a small island. This island is located in a cove on the Connecticut shore in the western end of the Sound. The hole *could* be such a mooring hole, or more properly, the beginnings of a mooring hole, for it is only an inch or so deep and was apparently never finished. Diligent search of the rest of the island failed to disclose any other holes or significant features, save other than a tiny, worn, pit-like depression on top of a massive glacial erratic at the southern end of the island. This find bears no relationship to the suspected hole.

Further survey revealed another likely hole on an island at the entrance to a harbor a mile or two west of the first site. This second hole was found in the summer of 1955. It too, was isolated, and was quite a bit deeper (deep enough to have been functional) and was situated in a manner convenient for mooring a vessel in the prescribed manner and out of the roll of a Southwesterly sea. The finding of these two holes was reported by several local newspapers, which, unfortunately, stated rather flatly that the holes had been "made by Norsemen." This is, perhaps, the unavoidable consequence of stories in the popular press, but the author wishes to state here that the holes are, of course, only tendered as *tentative* mooring hole finds predicated on the basis of the "Thorvald-Small-Boat-Theory." One swallow does not make a summer, and two holes don't clinch the hypothetical wanderings of theoretical Vikings!

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That one hole is not finished is not against its having been at least the start of a mooring hole. Perhaps a group intended to camp on or near the first island one night but later reconsidered. They might have very well started a hole, then moved on—perhaps to the next island. Such theorizing is admittedly far-fetched, but if there is anything at all to the entire notion, we must try to examine every possibility and follow up every lead so that we can ultimately find for or against the postulation.

It is, therefore, the author's hope that interested amateur archeologists such as yourselves, could be drawn to this phase of the overall problem and cooperate by informing me of any likely holes you might locate along the shores of Long Island Sound or its headlands, or in its coves, bays, harbors and river tributaries. Spread the word in your own area and personally evaluate such finds yourselves. If they seem worthy of further consideration, write and let me know. Give their exact locations (name of harbor, point, etc.) and where located i.e. east side, west side, etc. Also send data on how far they are from present mean tide levels, and any other pertinent information about them, such as weathering, presence of "bulged" sides, whether you have checked them against Coast and Geodetic Survey lists, and so forth. Photographs would be very desirable and could include a general view of the rock or ledge, and perhaps a close-up of the hole with a scale indicator in the picture. I don't know just what we can expect to develop from all this. Perhaps we will bring to light so many drilled holes in our shoreline rocks that it would have taken a veritable armada of Vikings drilling day and night to explain all of them! Again, we may get some meaningful pattern when plotting finds on a map of the region . . . Without the effort it is impossible to say. At all events, an open invitation is extended to those who would like to assist in "Project Thorvald": an attempt to test a theory stemming from assumed presence of Norsemen in eleventh century North America.

Author's Note:

The subject of this paper was presented before the Massachusetts Archeological Society at the annual Fall meeting in October, 1957. Various members at that time raised questions relative to original studies of mooring holes in Scandinavia (presumably by Danish or Norwegian archeologists). The author has no *first hand* knowledge of such studies, but presumes them to have been

undertaken. Likewise, questions bordering the realm of geology were advanced relative to rock weathering, shoreline emergence/submergence, et al. The author doubts seriously that reliable data for the time span we are treating are available on such things—particularly as to the weathering of coastal rock. I know of no study on just this subject, and previous research along similar lines (see problem on decay and fossilization rates of organic material in Cape Cod soils, in author's "*An Osseus Find At Follins Pond*", Massachusetts Archeological Society Bulletin, Vol. XVIII, No. 2, January 1957.), did not yield worthwhile geological information.

However, the author wishes to draw attention to the fact that this paper is not an attempt to be *definitive* on the subject, but merely introductory to some limited investigations. For such an approach, a delving into Scandinavian sources (possibly not translated into English?) or attempts to define chemical and physical alterations in coastal rocks in the past 1000 years, does not seem to be necessary.

B.W.P.

Footnotes

1. POHL, p. 86.
2. POHL, p. 86.
3. BRONSTED, p. 399.
4. POHL, p. 85.
5. *Stamford Advocate*, Sept. 29, 1955, *The Village Gazette*, Sept. 9, 1955 and *Greenwich Time*, Sept. 19, 1955.
6. POHL, p. 124-25.

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1952. *The Lost Discovery*. W. W. Norton & Co., Inc., New York.

Newspapers: *Stamford Advocate*, Stamford, Conn.; *The Village Gazette*, Old Greenwich, Conn.; and *Greenwich Time*, Greenwich, Conn.

EDITORIAL COMMENT

Several recently submitted papers have varied in typing and spacing, making it necessary to go through a tedious re-typing process prior to printing. Manuscripts should be typed full page on standard 8½x11 inch paper, double spaced, and on one side of the page only. Any footnotes should be held to a minimum, and typed at the end of the article. Bibliographies should take this form—

Fuller, Harry

1954. "Culture Traits of the Micmac Tribe."

Mass. Arch. Soc. Bulletin, Vol. 10, No. 3, pp. 46-52.

This standard procedure will aid greatly in estimating Bulletin spacing for 16, 20 or 24 page issues.

ONE VIEWPOINT

Once again we hear a classic and time worn objection to archaeological research. An Associated Press dispatch from Peterborough, Ontario, quotes Indian guide Dan Musgrove, aged 71, as saying: "They took away all our lands. Now they're digging up our ancestors to see whether they took anything with them." This in reference to the excavation of a burial mound near Rice Lake.

BLUEPRINT DANGER

A word of caution may be in order regarding too stereotyped a classification of any ancient culture level. Weapons and tools show the cumulative result of hereditary skill practiced over a long period from a common aboriginal root.

In England the flint chipping technique of the Stone Age did not reach its culmination until the earlier stages of the Bronze Age, when metal was still too rare to satisfy the demand for more advanced forms, and persisted even when new materials had become more generally available. In lowland Britain a distinct flint industry has been recognized for the Late Bronze Age; and, on a reduced basis, during the Early Iron Age.

Is the remaining recoverable evidence from the ground conclusively synonymous with the tribal culture of an area at a given period? Are we giving due importance to a constant infiltration of ideas and methods from without which dilute and modify tribal characteristics? Is classification tending toward a closed system of cultural stages laborously worked out to scale, or is it more correctly a flowing and constantly changing medium which cannot properly be pinpointed to any static period?